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09/842,769	04/27/2001	Toshiya Hagihara	1422-0472P	2832

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT PAPER NUMBER

1765

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/842,769

Applicant(s)

HAGIHARA ET AL.

Examiner

Lynette T. Umez-Eronini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 13-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 13, 14, 15, and 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Streinz et al. (US 6,015,506).

Streinz teaches a process for producing a substrate comprising a step of polishing a substrate to be polished with a polishing composition comprising:

water (column 4, lines 32-36) and

an abrasive (column 27-32 and 40-42).

Streinz also teaches known polishing slurry additives, such as stabilizers that include organic acids such as acetic, citric, and tartaric (column 8, lines 37-38), which read on, a roll-off reducing agent comprising one or more compound selected from the group consisting of carboxylic acids having 2 to 20 carbons atoms having either hydroxyl group or groups or SH group or groups, monocarboxylic acids having 1 to 20; carbon atoms and dicarboxylic acids having 2 to 3 carbon atoms, and salts thereof.

Streinz further teaches fumed alumina that may be comprised of amorphous alumina, high temperature crystalline phases of alumina consisting of gamma, theta, delta, and alpha alumina (column 5, lines 43-50), which reads on,

applicants' intermediate alumina, **in claim 13** and

also comprises applicants' intermediate alumina that is selected from the group consisting of  $\gamma$ -alumina,  $\delta$ -alumina,  $\theta$ -alumina,  $\eta$ -alumina,  $\kappa$ -alumina, and mixtures thereof, in claim **20**.

The above further reads on,

A process for producing a substrate comprising a step of polishing a substrate to be polished with a polishing composition comprising:

(A) one or more compounds selected from the group consisting of carboxylic acids having 2 to 20 carbon atoms having either hydroxyl group or groups or SH group or groups, monocarboxylic acid having 1 to 20 carbon atoms, dicarboxylic acids having 2 to 3 carbon atoms, and salts thereof;

(B) one or more compounds selected from the group consisting of polycarboxylic acids having 4 or more carbon atoms and having either OH or group or groups or SH group or groups, monocarboxylic acids having 1 to 20 carbon atoms, and dicarboxylic acids having 2 to 3 carbon atoms, and salts thereof;

(C) one or more compounds selected from the group consisting of an intermediate alumina and an alumina sol;

an abrasive; and

water, **in claim 14**; and

wherein one or more compounds of Compound (A) are selected from the group consisting of oxalic acid, malonic acid, glycolic acid, lactic acid, malic acid glyoxylic acid, tartaric acid, citric acid, gluconic acid, and salts thereof, and wherein one or more

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compounds of Compounds (B) are selected from the group consisting of succinic acid, maleic acid, fumaric acid, citraconic acid, itaconic acid, tricarballic acid, diglycolic acid, ethylene-diamine tetra acetic acid, diethylene triamine pentaacetic acid, and salts thereof, **in claim 22**;

wherein one or more compounds of Compound (A) are selected from the group consisting of oxalic acid, malonic acid, glycolic acid, tartaric acid, citric acid, and salts thereof, and wherein one or more compounds of Compounds (B) are selected from the group consisting of succinic acid, maleic acid, fumaric acid, itaconic acid, ethylene-diamine tetra acetic acid, diethylene triamine pentaacetic acid, and salts thereof, **in claim 23**;

Streinz also teaches fumed alumina that may be comprised of amorphous alumina, high temperature crystalline phases of alumina consisting of gamma, theta, delta, and alpha alumina (column 5, lines 43-50), which reads on and also encompasses applicants' intermediate alumina that is selected from the group consisting of, and mixtures thereof, **in claim 21**; and

Streinz further teaches, fumed abrasive such as fumed alumina, which comprises high temperature crystalline phases of alumina consisting of gamma, theta, delta, and alpha alumina (column 5, lines 42-50) and has a surface area ranging from  $5\text{m}^2/\text{g}$  to about  $430\text{m}^2/\text{g}$  and a particle size distribution of less than 1.0 microns and a mean particle diameter less than about 0.4 microns (column 2, lines 53-59), which encompasses applicants' intermediate alumina in Compounds (C) that has a specific

surface area of from 30 to 300 m<sup>2</sup>/g and average particle size of 0.01 to 5 μm, **in claim 15.**

3. Claims 17-19 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaufman (489).

As pertaining to claims 17-19, Kaufman teaches, “. . . a method for using the chemical polishing slurry to remove titanium . . . from a substrate” (Abstract). “The CMP slurry of this invention includes an abrasive” (column 4, line 46). “Preferably, the metal oxide abrasive is incorporated into the aqueous medium of the polishing slurry as a concentrated aqueous dispersion of metal oxides, . . . The aqueous dispersion of metal oxides may be produced utilizing conventional techniques, such as slowly adding the metal oxide abrasive to an appropriate media, for example, deionized water . . .” (column 5, lines 63).

Kaufman also teaches, “The CMP slurry of this invention includes an organic acid. “. . . the CMP slurry of the present invention to enhance the selectivity to oxide polishing rate, such as monofunctional acids, di-functional acids, hydroxyl/carboxylate acids, chelating, non-chelating acids, and their salts. Preferably, the organic acid is selected from the group of acetic acid (same as applicants monocarboxylic acid having 1 to 20 carbon atoms), adipic acid, butyric acid, capric acid, caproic acid, caprylic acid, citric acid, glutaric acid (same as applicant's polycarboxylic acid having 4 or more carbon atoms and having neither OH group(s) groups nor SH group(s)), lactic acid, lauric acid, malic acid, maleic acid (same as applicant's polycarboxylic acid having 4 or

more carbon atoms and having neither OH group(s) groups nor SH group(s)), malonic acid, myristic acid, oxalic acid, (same as applicant's dicarboxylic acid having 2 to 3 carbon atoms), palmitic acid, phthalic acid, propionic acid, pyruvic acid, stearic acid, succinic acid, tartaric acid, valeric acid and derivatives, including **salts thereof** (column 6, lines 1-14), which reads on applicant's roll-off reducing agent). The aforementioned reads on,

A process for producing a substrate comprising a step of polishing a substrate to be polished with a polishing composition comprising:

(A) one or more compounds selected from the group consisting of carboxylic acids having 2 to 20 carbon atoms having either OH or group or groups or SH group or groups, monocarboxylic acids having 1 to 20 carbon atoms, and dicarboxylic acids having 2 to 3 carbon atoms, and salts thereof;

(B) one or more compounds selected from polycarboxylic acids having 4 or more carbon atoms and having either OH or group or groups or SH group or groups, monocarboxylic acids having 1 to 20 carbon atoms, and dicarboxylic acids having 2 to 3 carbon atoms, and salts thereof;

an abrasive; and

water, **in claim 17**;

wherein one or more compounds of (A) are selected from the group consisting of carboxylic acids having 2 to 20 carbon atoms having either hydroxyl group or groups or SH group or groups, dicarboxylic acids having 2 to 3 carbon atoms, and having 4 or

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more carbon atoms and having either OH or group or groups or SH group or groups, aminopolycarboxylic acids, and salts thereof, **in claim 18**;

wherein one or more compounds of Compounds (A) are selected from the group consisting of oxalic acid, malonic acid, glycolic acid, lactic acid, malic acid, glyoxylic acid, tartaric acid, citric acid, gluconic acid, and salts thereof, and wherein one or more compounds of Compounds (B) are selected from the group consisting of succinic acid, maleic acid, fumaric acid, citraconic acid, itaconic acid, tricarballic acid, diglycolic acid, ethylene-diammine tetraacetic acid, diethylene triamine pentaacetic acid, and salts thereof, **in claim 19**; and

wherein one or more compounds of Compounds (A) are selected from the group consisting of oxalic acid, malonic acid, glycolic acid, tartaric acid, citric acid, and salts thereof, and wherein one or more compounds of Compounds (B) are selected from the group consisting of succinic acid, maleic acid, fumaric acid, itaconic acid, ethylene-diammine tetraacetic acid, diethylene triamine pentaacetic acid, and salts thereof, **in claim 24**.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



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5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Streinz (US '506) as applied to claim 14 above, and further in view of Taira et al. (US 6,569,216 B1).

Streinz differs in failing to teach wherein the intermediate alumina is prepared from aluminum hydroxide and/or alumina, each having a content of an alkali metal and a content of an alkaline earth metal of 0.1 % by weight or less.

Taira teaches, "A polishing composition comprising water, an abrasive, an intermediate alumina, and a chelating compound (same as applicants' carboxylic acids in Compounds (A), (B), and (C) or a salt thereof" (Abstract) and " . . . the following intermediate aluminas are preferable, from the viewpoints of the effects of increase in the polishing rate and reduction in the surface roughness. Their crystal forms are preferably  $\gamma$ -alumina,  $\delta$ -alumina,  $\theta$ -alumina, mixtures thereof, and the like, more preferably  $\gamma$ -alumina,  $\delta$ -alumina, mixtures thereof, especially preferably  $\gamma$ -alumina. In addition, their specific surface area is preferably from 30 to 300 m<sup>2</sup>/g, more preferably

from 50 to 200 m<sup>2</sup>/g. Their average particle size is preferably from 0.01 to 5 µm, more preferably from 0.05 to 5 µm, still more preferably from 0.1 to 3 µm, especially preferably from 0.1 to 1.5 µm. . . . In addition, the content of the alkali metal and the alkaline earth metal in the intermediate alumina particles is preferably 0.1% by weight or less, more preferably 0.05% by weight or less, especially preferably 0.01% by weight or less . . . " (column 8, line 34 - column 9, line 20).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Streinz's intermediate alumina by using one, which has the characteristics as that taught by Taira for the purpose of increasing in the polishing rate and reducing surface roughness (column 8, lines 36-39).

### ***Response to Arguments***

7. Applicants' arguments filed July 16, 2004 have been fully considered but they are not persuasive. Applicants traverse the 102 rejection of claims 13 and 14 as anticipated by Streinz (US 6,015,506) and the 103 rejection of claims 15 and 16 over Streinz (US '506) in view of Tiara US (6,569,216 B1) as failing to teach an intermediate alumina, which is used in combination with a roll-off agent.

Applicants' arguments are unpersuasive because Streinz discloses a polishing slurry that includes fumed alumina that may comprise high temperature crystalline phases of alumina consisting of gamma, theta, delta, and alpha alumina (column 5, lines 43-50), which reads on and comprises applicants' intermediate alumina. Streinz also teaches useful additive such as a stabilizer may be useful includes organic acids

such as acetic, citric, tartaric, and EDTA (column 8, lines 33), which further reads on applicants roll-off compound and the combination of an intermediate alumina and a roll off reducing agent.

Applicants traverse the 103 rejection of claims 17-29 as being anticipated by Kaufman (US 5,783,489) as failing to teach specific combination of Compounds (A) and Compounds (B). Applicants arguments are unpersuasive because Kaufman teaches a CMP slurry that includes a wide range of conventional organic acids, salts of organic acids, and mixture thereof, such as monofunctional acids and difunctional acids (column 6, lines 1-14), which comprises the same acids as applicants' Compound (A) and Compound (B).

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

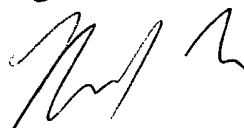
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**NADINE G. NORTON**  
**SUPERVISORY PATENT EXAMINER**



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September 6, 2004